## REMARKS

This is a response to the non-final Office Action mailed on July 27, 2004.

Regarding paragraph 1 of the Office Action, an Abstract is provided herein.

Regarding paragraph 2 of the Office Action, the claims have been amended in response thereto.

Generally, claims 1, 3-12 and 14-16 have been amended to improve clarity and readability. Claims 2 and 13 are cancelled, and claims 17-19 are new. The subject matter of claims 2 and 13 has been included in claims 1 and 12, respectively. The amended and new claims are supported by the specification and no new matter is entered.

Claims 1, 2, 6-8 and 11-13 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. patent 5,903,357 to Colak. Applicant respectfully traverses the rejection.

Colak provides a method for imaging a turbid medium in which the possible strengths assignable to a pixel can be derived from a combination of a weighting function and the differences between the measured photon fluence and an expected photon fluence for each light source position and each detector position (col. 2, lines 42-46). In particular, an intensity at a detector position is provided by $I=A_0\Phi_0(r_d)[1-qP(r_l, r_s, r_d)]$, where $A_0$ is a collection area, q is a perturbation strength and $\Phi_0(r_d)=\frac{S_0}{4\pi D}\frac{\exp[-K|r_d-r_s|]}{|r_d-r_s|}$, where $S_0$ represents the initial source intensity and $D=1/3(\mu'_s+\mu_a)$ represents the normalized photon diffusion coefficient.

The Examiner apparently points to the normalized photon diffusion coefficient D of Colak as teaching normalizing first and second vectors of measured data as set forth in Applicant's claim 1. The Examiner also points to the photon density $\Phi_0(r)$ and the resulting photon fluence rate $\Phi(r)$ of Colak (col. 5, formulas (1) and (2)) as teaching providing first and second vectors of measured data as set forth in Applicant's claim 1. However, the normalized photon diffusion coefficient D is not obtained by normalizing $\Phi_0(r)$ and $\Phi(r)$.

In fact, Colak simply provides no disclosure or suggestion of Applicant's claimed technique which includes normalizing a difference between first and second vectors of

measured data according to a ratio of: (a) a difference between the first and second vectors, and (b) the second vector, solving a modified perturbation equation that relates the normalized difference and a vector of reference data, and generating an image of at least one scattering target medium responsive to the solving.

As noted in Applicant's specification, the approach of the present invention provides significant advantages over the approaches provided by Colak and the other cited references.

In particular, the invention addresses problems found with conventional approaches to reconstructing images by solving a perturbation equation. These problems include a failure to address concerns such as variable coupling efficiency of light entering and exiting tissue, and the effect of scattering in greatly increasing the pathlength of the propagating energy such that small changes in the estimated absorption or scattering properties of the medium can, depending on the distance separating the source and detector, greatly influence the density of emerging energy (page 5, lines 3-19). To achieve this, in one approach, the present invention modifies the standard perturbation equation by replacing $\delta\mu$, the vector of source-detector pair intensity differences, with a proportionate relative difference between two measured values multiplied by a reference term of the required units (page 14, lines 17 and 18; page 15, lines 11-20). This approach advantageously limits the effects of modeling errors and minimizes ill-conditioning of the inverse problem while retaining the correct units in the solution, among other benefits.

The cited references simply do not address or solve these problems.

Withdrawal of the rejection under Colak is therefore respectfully requested.

Claim 9 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 5,903,357 to Colak in view of U.S. patent 5,625,458 to Alfano. Claim 9 as amended sets forth that that first and second vectors of measured data are obtained at different time instants to provide dynamic imaging data of the at least one scattering target medium. In contrast, the time windows mentioned by Alfano only refer to very short time periods for capturing the light, not to different time instants to provide dynamic imaging data. These time windows relate to the fact that Alfano uses very short light pulses from ultrafast lasers, on the order of picoseconds (Fig. 6).

Moreover, there is no motivation to combine the teachings of Alfano and Colak, and it is not even clear how such a combination could result in a functioning system.

Accordingly, Alfano fails to cure the deficiencies of Colak.

Withdrawal of the rejection under Colak and Alfano is therefore respectfully requested.

Applicant acknowledges that claims 3-5, 10 and 14-16 contain allowable subject matter.

In conclusion, Applicant respectfully submits that the above-identified application is in condition for immediate allowance, and such allowance is respectfully solicited. If the Examiner believes a telephone conference might expedite the allowance of this application, the Examiner is respectfully requested to telephone the undersigned.

Respectfully submitted,

Ralph F. Hoppin

Ralph F. Hoppin
Reg. No. 38,494

Scully, Scott, Murphy & Presser
400 Garden City Plaza, Suite 300
Garden City, New York 11530
(516) 742-4343

PIB:RH